



## CERTIFICATION/VERIFICATION

I do hereby declare under the penalty of perjury under the laws of the United States of America that the translation attached herewith is, to the best of my knowledge and ability, a complete, true, correct, ENGLISH language translation providing all information contained in the original JAPANESE language document(s) also attached herewith.

I am fluent in the JAPANESE and the ENGLISH language.

So executed in

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Abstract: 1

[Document ID] SPECIFICATION

[Title of the Invention] MUSICAL PERFORMANCE SELF-TRAINING APPARATUS

[What is claimed is:]

1. A musical performance self-training apparatus instructing a music instrumental performance for supporting a player by displaying note information on a display means, comprising:  
a performance instruction means for performance instruction for every unit, the unit define a region of a music to be performed, wherein the performance instruction means being constructed so as to be able to operate selectively in an automatic mode in which designation of the unit is automatically performed according to a predetermined progress, or in a manual mode in which an optional unit can be designated by manual operation.
2. The musical performance self-training apparatus according to claim 1, further comprising a display means that displays a lesson menu by which the unit is able to be designated, the unit is an objection for performance, wherein the display means displays a mode selection switch on the lesson menu for selecting the automatic mode or manual mode the selection switch.
3. The musical performance self-training apparatus according to claim 2, comprising lesson interruption means for displaying the lesson menu, while the performance instruction is given in the automatic mode.
4. The musical performance self-training apparatus according to claim 2, wherein  
the lesson menu having the units which are provided to include wider range of musical tone information, as the skill level beco

me higher, are displayed according to the skill level corresponding to the score, and

in the automatic mode, the performance instruction means designates a unit to be played at the earliest timing, in which performance thereof has not reached a predetermined acceptable standard,

of the units on the lesson menu, as a unit of which performance instruction is to be displayed next, and when performance of all units in the same skill level has reached the acceptable standard, the unit of which performance instruction is to be displayed

next is selected from units in the upper ranking skill level than the current skill level and designated.

5. The musical performance self-training apparatus according to claim 2, wherein

the lesson, menu having the units which are provided to include a wider range of musical tone information, as the skill level become higher, are displayed according to the skill level corresponding to the score, and

in the automatic mode, the performance instruction means designates a unit to be played at the earliest timing, in which performance

thereof has not reached a predetermined acceptable standard, of the units on the lesson menu, as a unit of which performance instruction is to be displayed next, and when performance of all units in the lower-ranking skill level included in a unit of the higher ranking skill level has reached the acceptable standard,

the higher ranking unit is designated as the unit of which performance instruction is to be displayed next.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention also relates to a musical performance self-training apparatus that can avoid such a situation that the training becomes monotony, by having a mode in which a player him/herself can determine the training progress and a mode in which the progress is instructed automatically.

[0002]

[Description of the Related Art]

10        There is known an apparatus which plays performance data stored in a recording medium by a personal computer, and displays an image representing sheet of music sequentially on a screen, to thereby give a performance instruction. For example, in Japanese Patent Application Laid-Open No.Hei 9-305171, there is disclosed an  
15        apparatus which gives a performance instruction in which keys are instructed sequentially by graphical bars. More specifically, in this apparatus, a figure of a keyboard is displayed on a screen, and a scroll bar having a length corresponding to the duration of key depression is also displayed corresponding to each key on the  
20        displayed keyboard, and this scroll bar is scrolled so that the scroll bar approaches the keyboard figure, as the auto-playing data is played.

[0003]

      According to this conventional performance instruction  
25        apparatus, the player can recognize the duration of key depression intuitively, and a key to be depressed subsequent to the key being depressed now can be known in advance. Therefore, even a player

who cannot read the musical score can play smoothly.

[0004]

[Technical Problems to be solved by the Invention]

However, with the conventional performance instruction  
5 apparatus, since the performance data is only played sequentially  
from the beginning which is monotonous, the player become bored.  
Moreover, even if there is a part which the player wants to practice  
selectively, with the apparatus which advances practicing so that  
the entire music can be mastered at a certain skill level, selection  
10 of the practicing part or practicing progress against his/her will  
may be forced on the player.

[0005]

In order to solve the above problem, a mode can be considered  
in which the player can freely determine the progress to practice,  
15 but if this mode is for freely playing far apart from the automatic  
mode in which the progress is instructed automatically, the relation  
between the automatic mode and this mode becomes weak, and hence  
consistent practice cannot be performed. There is also a demand  
for a musical performance self-training apparatus, which keeps  
20 flexible in selecting progress by the player, while maintaining  
the practicing function in the automatic mode.

[0006]

It is an object of the present invention to provide a musical  
performance self-training apparatus, which can change the practice  
25 progress by the player him/herself, while maintaining the function  
capable of instructing progress automatically.

[0007]

[Means to solve the technical Problems]

In order to accomplish the above objections, the present invention having constituent features recited bellow.

The first feature of the present invention is a musical  
5 performance self-training apparatus displaying musical tone  
information for supporting a player, comprising a performance  
instruction means that designates a region within a predetermined  
music to be performed, wherein the performance instruction means  
being constructed so as to be able to operate selectively in an  
10 automatic mode in which designation of the unit is automatically  
performed according to predetermined progress, or in a manual mode  
in which an optional unit can be designated by manual operation.  
[0008]

According to the first feature, a desired unit is designated  
15 by a player according to his or her practice or lesson progression  
in addition to the automatic mode, in which the performance  
instruction is automatically progressed in each unit, and hence  
the lesson progression can be advanced or delayed, optionally.  
[0009]

20 The second feature of the present invention is that the  
apparatus comprising a display means for displaying a lesson menu  
with which a unit to be instructed for performance can be designated,  
wherein the display means is configured to display a mode selection  
switch on the lesson menu in order to select the automatic mode  
25 or the manual mode.  
[0010]

According to the second feature, a unit to be practiced is

designated by means of the lesson menu, and while the lesson menu is displayed, the automatic mode and the manual mode can be switched each other alternately, as desired.

[0011]

5       The third feature of the present invention is the apparatus that comprises a lesson interruption means for allowing the lesson menu to be displayed in place of display of performance instruction for selection of the manual mode, while the performance instruction is given in the auto-mode. According to the third feature, when  
10 the lesson is stopped, designation of the unit can be transferred to a desired unit even while the performance instruction is executed in the automatic mode same as the manual mode.

[0012]

      The fourth feature of the present invention is the apparatus  
15 wherein the lesson menu is displayed according to a skill level with the unit that is determined so as to include a wider range of musical tone information, as the skill level become higher, corresponding to a performance data, wherein the performance instruction means, in the automatic mode, designates a unit to be  
20 played at the earliest timing, in which performance thereof has not reached a predetermined acceptable standard, of the units on the lesson menu, as a unit of which performance instruction is to be displayed next, and when performance of all units in the same skill level has reached the acceptable standard, the unit of which  
25 performance instruction is to be displayed next is selected from units in the upper ranking skill level than the current skill level and designated.



[0013]

According to the fourth feature, if the performance related to all units of the same skill level reach the acceptable standard, the player cannot advance to the upper level training, and hence  
5 the player can be reliably master the music.

[0014]

The fifth feature of the present invention is the apparatus wherein the lesson menu having the units which are provided to include wider range of musical tone information, as the skill level become  
10 higher, are displayed according to the skill level corresponding to the score, and the performance instruction means designates a unit to be played at the earliest timing, in which performance thereof has not reached a predetermined acceptable standard, of the units on the lesson menu, as a unit of which performance instruction is  
15 to be displayed next, and when performance of all units in the lower-ranking skill level included in a unit of the higher ranking skill level has reached the acceptable standard, the higher ranking unit is designated as the unit of which performance instruction is to be displayed next.

20 [0015]

According to the fifth feature, if the player can performance related to the units of certain level collectively, the player can advance to the lesson of the units in the upper skill level including these units.

25 [0016]

[Preferred Embodiment]

The present invention will be described in detail, with

reference to the drawings. Fig. 2 is a block diagram showing the constituent of the musical performance self-training apparatus according to one embodiment of the present invention. In the Fig. 2, a personal computer 1, that is, a PC comprises a PC body 11, a keyboard 12 and a mouse 13 as an input unit, and a display 14 as an output unit. For the PC body 11, one having a known constituent having a hard disk, ROM, RAM and the like can be used. It is desired that the PC body 11 comprise an interface that can input and output an MIDI (musical instrument digital interface) signal.

10 [0017]

A keyboard instrument 2 comprises a keyboard 21 and a sound system 22. The keyboard 21 comprises a detection circuit 23 for detecting key depression and key release information on the keyboard 21, and a tone generator 24 for generating tone corresponding to the key-on or key-off information. When the detection circuit 23 detects key depression or key release on the keyboard 21, the tone generator 24 generates the tone, based on the depressed key number (key number), the key-on length, the key-on velocity and the like, and outputs (produces) musical sound through the sound system 22. It is desired that the keyboard instrument 2 also comprise an MIDI. The overall operation of the keyboard instrument 2 is controlled by a microcomputer (not shown).

[0018]

The PC body 11 and the keyboard instrument 2 are connected via an interface such as the MIDI (not shown), so that a signal can be transferred between these.

[0019]

In the musical performance self-training apparatus, music information for training can be externally supplied, or is stored in a known storage medium such as a hard disk in the PC body 11 beforehand may be used. The music for training is prepared as performance data such as a pitch data (note number), key depression data (key-on time, key-off time), velocity, and tempo data. The performance data may include data other than the above-described data, but it is not the main part of the present invention, and hence the description thereof is omitted.

10 [0020]

The selected music information can be played not only from the beginning, but may be played halfway of the music. The training part may be automatically designated, or may be designated manually by the player him/herself. The training part can be designated for each predetermined range (referred to as a unit). The unit comprises notes which are included in one or a plurality of bars, and as the degree of skill level, that is, the grade becomes higher, the number of bars constituting one unit increases. In a top-level grade, entire music that is performed is regarded as one unit.

20 [0021]

Here, explanation is given by assuming that the unit is composed of a plurality of bars, but the construction or the number of the bars which constitutes the unit is variable, and may be composed of not only the bars, but also optional part of the music. For example, musically natural training is possible, by constituting one unit by one or a plurality of motifs or phrases. In short, it is only necessary to constitute the unit so as to include wide range of

note information, so that as the rank, that is, the skill level becomes higher, the player can have training for longer performance at a stretch.

[0022]

5           In the case of automatic mode in which the unit is automatically designated, the training unit is automatically designated according to the predetermined progress. For example, the skill level is automatically judged by the PC 1 based on the performance result, to designate the unit for next performance, taking into consideration  
10   that the player does not train repetitively for the unit in which the skill level has reached the acceptable standard.

[0023]

On the other hand, in the case of manual mode in which the unit is manually designated, the player him/herself can selectively  
15   designate the unit which he/she wants to have training. The manual mode may be released to return to the automatic mode, or the lesson may be interrupted during the automatic mode to optionally designate a unit. A data for generating a mode selection display on a screen can be included in the performance data so as to be displayed on  
20   the display 14 at a predetermined timing.

[0024]

Fig. 3 is a diagram showing one example of the lesson menu, the diaphragm includes units for each rank corresponding to the score. In Fig. 3, one or plural unit U which has various size are  
25   set for each rank, with respect to the score for 12 bars displayed on the display 14. When the music is longer than the length of one screen, the screen is scrolled from the right to the left, to thereby

display up to the last part of the music score. Alternatively, instead of scrolling the screen, the part of the music or the whole part may be displayed, by enlarging or reducing the display size. For example, displayed buttons "+" and "-" on the left bottom corner  
5 on the screen can be operated to scale the screen.

[0025]

The skill level in the performance is designated as rank R1, R2, R3, R4 and R5 in order of from the higher rank, and the unit in which the size, that is, the number of bars included therein,  
10 is changed is set corresponding to each rank. In the lowest rank R5, two bars constitute one unit, and in the next higher rank R4, four bars constitute one unit. In this manner, as the rank becomes higher, the number of bars constituting one unit increases.

[0026]

15 The lesson menu is a list, in which the result based on the performance result can be seen at a glance, and is also a display of the next training unit. When the music performance of the designated unit has finished, the performance result is compared with the prepared model performance data, to judge the result. The  
20 result is displayed in the lesson menu with a character representing the grade, and the unit which has not reached the acceptable standard is designated again.

[0027]

In the example shown in Fig. 3, it is displayed with a stripe  
25 of spot pattern that the training of unit U1 consisting of the first bar and the second bar in rank R5 has finished, and unit U2 consisting of the third bar and the fourth bar is displayed with a frame as

the next training unit. The result is displayed in the unit already played. The result is displayed with characters of S, A, B, C and D in order of higher grade. In the units U1 and U3 having reached the acceptable standard, the character of grade "S" and a band  
5 indicating acceptance are displayed. However, this classification of result is an example only, and the number of grades can be optionally set, and the acceptable standard can be elevated, as the rank becomes higher. When the acceptable standard has not been reached, the designation of the unit is not updated, and the same unit is designated  
10 again.

[0028]

In the mode of automatically designating the unit, a unit to be played at the earliest timing in the same rank, of the units which has not reached the acceptance mark, is designated. Since  
15 the result of the unit having the same musical tone information is managed collectively, as shown in the Fig. 3, when the unit U1 has reached the acceptance mark, the unit U3 consisting of the ninth and the tenth bars having the same music tone information or note data array as that of the unit U1 is regarded as having trained  
20 already, and the result is displayed. Therefore, it is avoided to have repetitive practice of the mastered unit.

[0029]

When a unit is designated, the key depression instruction described later is displayed on the display 14, based on the prepared  
25 performance data of the designated unit. The player can repetitively train according to the display of the key depression instruction, until the skill level of performance is enhanced for each unit,

that is, a predetermined acceptance judgment is obtained.

[0030]

When all units are judged as being acceptable with respect to the current training rank, the player can proceed to the next  
5 higher rank, where a unit having a larger size, that is, a unit having a large number of bars is designated, and the performance data for this unit is played. For example, when the player has come up to the standard in rank R5, the player proceeds to rank R4, where unit U4 is designated, and the performance data is played. In rank  
10 R4, the player has training for the number of bars twice the number in rank R5 at a stretch or without interruption. As the rank becomes higher, the degree of difficulty, that is, the tempo and the acceptable standard is increased, thereby training of higher degree corresponding to the skill level becomes possible.

15 [0031]

On the other hand, in the case of training in the manual mode, the unit is designated selectively, by the player's own will, to play the performance data. Therefore, training can be performed repetitively until the trainee is satisfied. However, if the player  
20 can totally optionally designate the unit in the manual mode, the training may not be resultful, and hence it is desired that the rank cannot be elevated until the performance result reaches the allowable level. In other words, until all units in the current rank reach the acceptance mark, only the unit in the current rank  
25 can be designated, and the unit in the higher rank cannot be designated.

[0032]

Each unit can have the data structure described below. That is, unit result information, link information and result information can be included as the data of each unit.

[0033]

- 5       The unit result information shows training result for each unit, and can include high score, average score, registered date of result, and the like. The unit having the same musical tone information is managed with the common unit result information, with a unique ID enabling identification of the unit.

10   [0034]

- The link information is registered for each unit, and having the lead position and the tail end position (both are set as time information) of the unit based on the beginning of the music, and a link ID which links a plurality of units having the same musical  
15   tone information. The result information has array information of the link information for each rank and each unit in the entire music.

[0035]

- The processing by the musical performance self-training apparatus will be described, with reference to the flowchart. Fig.  
20   4 is a main flowchart. In step S1, initialization of the PC1 including clear of a VRAM, which stores image data for displaying an image on the display 14, and clear of timer counter is conducted. In step S2, a music is selected. For example, a list of music is displayed on the display 14, and the player selects one from the list, by  
25   operating the keyboard 12 and the mouse 13. After selection of the music, process proceeds to step S3, where a judgment that judges whether designation process is executed by automatic mode or manual



mode. An instruction information that instructs automatic designation or manual designation may be included in the performance data to omit giving an instruction operation to indicate automatic or manual. An indication for demanding a mode instruction may be  
5 displayed on the screen to make the player can select the mode. Thus, the player can select the mode on the displayed select screen with the keyboard 12 or the mouse 13.

[0036]

As the automatic mode is selected, the process advances step  
10 S4 then the content of the lesson is automatically set. That is, the unit which performance data to be played is automatically designated. Automatic unit designation is also described later.

[0037]

As the manual mode is selected, the process proceeds to step  
15 3, then the lesson menu is displayed. In step S3, it is desired to display a message to call a player's attention for giving instruction, such as "Please designate a unit", on the lower part of the screen. In the initial menu, the first unit in the lower most rank is designated. If the player likes it better as it is,  
20 the player inputs start instruction by using the keyboard and the like. When the player wants to change the initial menu, he or she designates a unit as desired by indicating the frame of unit on the menu.

[0038]

25 In step S6, it is judged whether a start instruction has been input. When the start instruction is given, process proceeds to step S7. An icon for start instruction may be included in the lesson

menu. In step S7, it is judged whether the training mode is the automatic mode or the manual mode. When process proceeds to step S5 after interrupting the lesson to display the lesson menu, as described later, the mode setting is confirmed again here. If the  
5 unit designation mode is the automatic mode, process proceeds to step S4, or if the unit designation mode is the manual mode, process proceeds to step S108. In step S8, the designated unit is displayed in the lesson menu, then content or performance data of the unit is read out to start the lesson.

10 [0039]

In step S9, a key depression instruction is displayed on the display 14 according to the performance data. An example of the key depression instruction has described previously in Figs. 6. In step S10, notes included in the performance data, that is,  
15 accompaniment and metronome sound are played. This sound can be generated by using the tone generator 24 and the sound system 22 of the keyboard instrument 2. In step S11, the performance results of the player are read in the PC 1 for judging the result. Steps S9 to S11 are executed by interrupt handling. When the designated  
20 sound pitch that is generated in the basis of the performance data does not coincide with the pitch of the played sound, display for the keying instruction is stopped to proceed. If the player represses the key and the pitch corresponding to the repressed key coincide with the pitch corresponding to the performance data, display for  
25 the keying instruction is proceeded to advance.

[0040]

In step S12, it is judged whether the lesson is interrupted

to display the lesson menu. In other words, even in the automatic mode, the lesson menu is displayed during training, by accepting the instruction to display the lesson menu, so that the player can designate a unit. If there is an instruction to display the lesson menu, in step S13, the lesson is interrupted, and the display of the key depression instruction information is stopped, to proceed to step S4.

[0041]

When an instruction to display the lesson menu is not input during a predetermined stand-by time, process proceeds to step S14, to judge whether the lesson has been finished. When all of the performance data of the designated unit is played, the judgment in this step S14 becomes affirmative. In step S15, the result processing is carried out. In the result processing, the performance result read in step S11, that is, the actual performance data, that is, depressed key data is compared with the performance data, and the result is decided according to the difference between them. The comparison is executed in relative to the length, the velocity and the tempo, and the number of miss-touch. The number of playing a key different from the designated key may be compared with the number in the acceptable standard. In the result processing, the rank is determined according to the comparison result.

[0042]

As a result of the result processing, it is judged whether the performance of the unit has reached the acceptable standard. In step S16, it is judged whether to continue the lesson, based on the presence of instruction of the player input by the keyboard

12 and the like. If it is judged to continue the lesson, process proceeds to step S3. If there is no instruction to continue, this processing finishes. If there is the instruction to continue, and process returns to step S3, and when the performance has reached  
5 the acceptable standard, a unit to be played next is set, and when the performance has not reached the acceptable standard, the same unit is designated again.

[0043]

While the lesson menu is displayed, the automatic mode or the  
10 manual mode can be instructed on the lesson menu. For example, in the automatic mode, when the player wants to display the lesson menu, in step S5, the player can select the mode, as well as designating the unit. When the manual mode is instructed, process proceeds from step S7 to step S8. When the unit is selected and the automatic  
15 mode is maintained as it is, process shifts from step S7 to step S4. When the unit is designated and process proceeds to step S104, the lesson in the automatic mode is started from the designated unit. When the unit designating mode is changed over from the manual mode to the automatic mode, the lesson is started from the current  
20 unit in the automatic mode.

[0044]

When the lesson menu is displayed to designate a unit, while the key depression instruction is given in the automatic mode, it is possible not only to jump to a unit ahead, but also to designate  
25 a unit in which the playing has been performed and reached the acceptable standard, to improve the performance skill level until the player is satisfied. In this case, when the performance of the

designated unit has finished, practice proceeds to a unit to be played at an earlier timing, of the units whose performance has not been conducted. The result is updated to the newest one.

[0045]

5           Fig. 5 is a flowchart for automatic unit designation. In step S31, it is judged whether the performance for all units in the highest rank has come up to the passing mark. If the player has not passed the highest rank, process proceeds to step S42, to judge whether the performance of all units in the current rank is acceptable based  
10   on the unit result information. If this judgment is negative, process proceeds to step S44, to designate the training unit to be played next. For example, as shown in Fig. 3, the display is changed such that unit U2 is enclosed by a frame, and then process proceeds to step S7 (Fig. 4). If the judgment in step S34 is affirmative, process  
15   proceeds to step S43, to elevate the rank by one stage, and process proceeds to step S44. For example, when the rank is elevated by one stage from rank R5 to rank R4, in step S36 immediately thereafter, a unit consisting of the first four bars in rank R4 is designated. In this manner, when the player is passed the highest rank R1, the  
20   judgment in step S41 becomes affirmative, to finish the processing.

[0046]

Fig. 6 is a diagram showing one example of the key depression instruction displayed on the display 14 in step S5 shown in Fig. 4. In the Fig. 6, the keyboard figure is displayed on the upper  
25   part and the lower part of the screen. In order to make it easy to see to which key on the keyboard the key depression instruction corresponds, the keyboard figure K is displayed on upper and lower

area of the screen, but this figure may be displayed only on the lower area of the screen. A plurality of substantially rectangular marks having a length corresponding to a length or a vertical size of the note, and a width of the white key in the keyboard figure K, and displayed between the keyboard figures K and K, is the key depression instruction. One mark corresponds to one note. On the display, the vertical direction indicates a time axis, and as the key depression instruction mark becomes closer to the lower keyboard figure K, it shows a note to be played at the earlier timing. The key depression instruction mark moves downward at a predetermined tempo, and it is the timing to play the key immediately below the mark when the lower end of each key depression instruction mark M reaches the upper edge of the lower keyboard figure K. On the other hand, it is the key release timing of the key when a key depression instruction mark corresponding to the key now being depressed is scrolled downward and disappears from the screen. The movement, that is, scrolling of the key depression instruction mark is executed, when the player pushes or releases the key.

[0047]

As the display method of the key depression instruction, for example, one described in Japanese Patent Application No. 2001-352206 according to the application by the present applicant may be applied. Display of the key depression instruction is not limited to the scroll type in which musical parts are sequentially scrolled, and the entire music may be instructed at the same time, or scrolling or switching of the screen may be carried out so that the predetermined number of bars is displayed on one screen, to

out the performance data of the designated unit from the performance data storage 4, according to the instruction input with the unit designation button L1 and the designation of the unit, and inputs the performance data to a key depression instruction section 6.

- 5 The key depression instruction section 6 displays the key depression instruction on the display 14, based on the input performance data.  
[0050]

When the key depression instruction is to be displayed, the lesson menu is deleted from the display 14, and when the lesson  
10 menu is to be displayed, the key depression instruction is deleted from the display 14. The lesson menu is displayed every time the performance of the designated unit is finished and evaluated, but a lesson interruption switch L4 is provided so as to correspond to a case where the player wants to display the lesson menu halfway  
15 through the performance. This lesson interruption switch (icon) L4 can be superimposed on the key depression instruction display. When the lesson interruption switch L4 is pressed, the key depression instruction displayed on the display 14 is replaced with the lesson menu.

- 20 [0051]

The display format of the lesson menu is not limited to the image corresponding to the score, as shown in Fig. 3. Fig. 7 is a diagram showing an example of the lesson menu, in a mode in which the score is represented by a keyboard figure and a mark corresponding  
25 to the keyboard figure (referred to as a piano roll view mode). The keyboard figure K is arranged in the lower part of the screen, and above this keyboard figure K, a time axis is elongated vertically,

proceed the display forward.

[0048]

Fig. 1 is a block diagram showing the main function of the musical performance self-training apparatus according to the embodiment of the present invention. In this figure, a lesson menu generator 3 generates a data for displaying the lesson menu as shown in Fig. 3. A performance data storage 4 stores performance data. The lesson menu generator 3 generates data for displaying the menu, by using the performance data and the key depression information detected by the detection circuit 23, and the menu is displayed on the display 14 according to the data supplied with lesson menu generator 3. The lesson menu includes a unit to be played next and the result of the played unit (grade and acceptance judgment), and various instruction switches (icon) are also displayed, such as a unit designation button L1, a mode switch L2, a start switch L3 and the like. For example, by indicating the mode switch L2 by the keyboard 12 or the mouse 13, the current unit designation mode is inverted. When the mode is the automatic mode, it is changed over to the manual mode, and when the mode is the manual mode, it is changed over to the automatic mode. The unit designation button L1 is displayed in the manual mode, and by indicating this button L1 by the keyboard 12 or the mouse 13, and instructing to display a desired unit, the unit to be played next is designated. The start switch L3 is provided for instructing start of the lesson after the unit has been designated.

[0049]

When the start switch L3 is pressed, a progress control 5 reads



and a rectangular mark M having a length (size along to the time axis) corresponding to the length of the note is displayed. On the right side of this mark, a unit for each rank is displayed.

[0052]

- 5        In Fig. 7, there is shown an example in which the unit including the first to the fourth bars in rank R5 is performed acceptably, and the unit including the fifth to the eighth bars is performed unacceptably (grade D), and hence the unit consisting of the fifth and sixth bars is designated again.

10      [0053]

- In the above-described embodiment, the unit is designated such that when the performance of one unit is executed acceptably, the next bar is selected in the same rank to be played. However, the designating method is not limited to this, and the unit may be set  
15      so that the player can have continuous training for many bars at a stage as early as possible.

[0054]

- For example, in Fig. 3, when unit U1 and the unit adjacent to unit U1 are accepted, the next unit in the same rank is not designated  
20      next, but the rank is elevated by one and the first unit in the upper rank R4 may be designated. Since the first unit in rank R4 consists of the first two units in rank R5, relatively long performance can be experienced in rank R4 where training for these two units is performed in succession.

25      [0055]

- When the performance of the first unit in rank R4 is accepted, returning to rank R5 again, the third unit is selected. When the

performance of this unit is accepted, the fourth unit in rank R5 is selected. When the performance of the fourth unit in rank R5 is accepted, the second unit in rank R4 is selected. When the performance of the second unit is accepted, the first unit in rank  
5 R3 is selected. In this manner, when the performance of the unit in the lower rank included in one unit of the upper rank is accepted, training can be performed by proceeding to the upper rank in order to play longer bars of music.

[0056]

10 The key depression instruction is set such that unless the key as instructed is not played, scroll is not carried out, in order to improve the skill level. However, in the highest rank R1, the skill level of the player should be improved. Therefore, even if the key is not played as the key depression instruction indicates,  
15 the key depression instruction information, that is, the mark may be scrolled. It is for enabling through training of the entire music.

[0057]

[Advantages of the invention]

As described above, according to the inventions of claim 1-5,  
20 performance designation is proceeded for each unit that provides a region of the musical tone information. This unit designation is executed by selecting one of the two modes. One is a mode in which unit designation executed automatically according to the predetermined progression, and another is a mode in which unit  
25 designation is executed by manually as desired. Accordingly, the player can play with the mode that is not only the mode in which performance designation is automatically proceeded by predetermined

uniformity progression, but also the mode in which the performance designation progression can be delayed or repeated as the player desired.

[0058]

- 5           Especially, according to the invention of claim 2, player can select one of the automatic mode and the manual mode by means of the lesson menu. According to the invention of claim 3, if the performance is interrupted in the automatic mode, the lesson menu is displayed thus the player can designate unit by manually.
- 10   Accordingly, even if the exercise of the current designated unit is not finished while the automatic mode is progressing, it can be dealt with a requirement of the player that he or she want to proceed forward or return back to previous unit for further exercise.

[0059]

- 15           According to the inventions of claim 4,5 if the performance of the predetermined unit of every skill level is become acceptable level, player can advance to higher-level exercise. Accordingly, player can expand exercise area gradually and can advance his or her skill by degrees.

20   [Brief Description of the Drawings]

Fig. 1 is a block diagram showing the main function of a musical performance self-training apparatus according to an embodiment of the present invention;

- Fig. 2 is a system block diagram of the musical performance self-training apparatus according to the first embodiment of the present invention;
- 25

Fig. 3 is a diagram showing a display example of a lesson menu;

Fig. 4 is a flowchart showing the operation of the musical performance self-training apparatus according to a second embodiment;

Fig. 5 is a flowchart showing unit designation processing;

Fig. 6 is a diagram showing a display example of a key depression  
5 instruction;

Fig. 7 is a diagram showing another display example of a lesson menu.

[Description of Reference Numerals]

1: personal computer, 2: keyboard musical instrument, 3: lesson  
10 menugenerator, 4: performance data storage, 5: progress controller,  
6: key depression instruction section, 12: keyboard, 14: display

15

[Title of the Document] ABSTRACT

[Abstract]

[Object]

The apparatus of the present invention improves training  
5 efficiency, and monotonous repetition of training is avoided.

[Solution means]

A progress controller 5 designates a unit that is a portion  
of music to be played according to the predetermined progress  
automatically in the basis of a performance data. The performance  
10 data of the designated unit is inputted to a depression instruction  
section 6, then the depression instruction is displayed that is  
able to be scrolled on the display 14. A mode switch L2 including  
a manual mode for designation by manual operation is provided. If  
the switch L2 is switched to manual mode, player can selects unit  
15 by pushing a unit designation button L1 and by instructing unit  
displayed on the screen. If an interruption switch L4 is pushed,  
the lesson menu is displayed, then the player can designate desired  
unit while in the automatic mode.

[Representative Drawing] Fig. 1

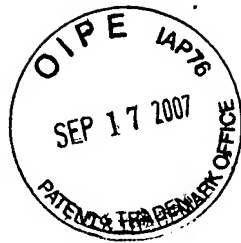


Fig. 1

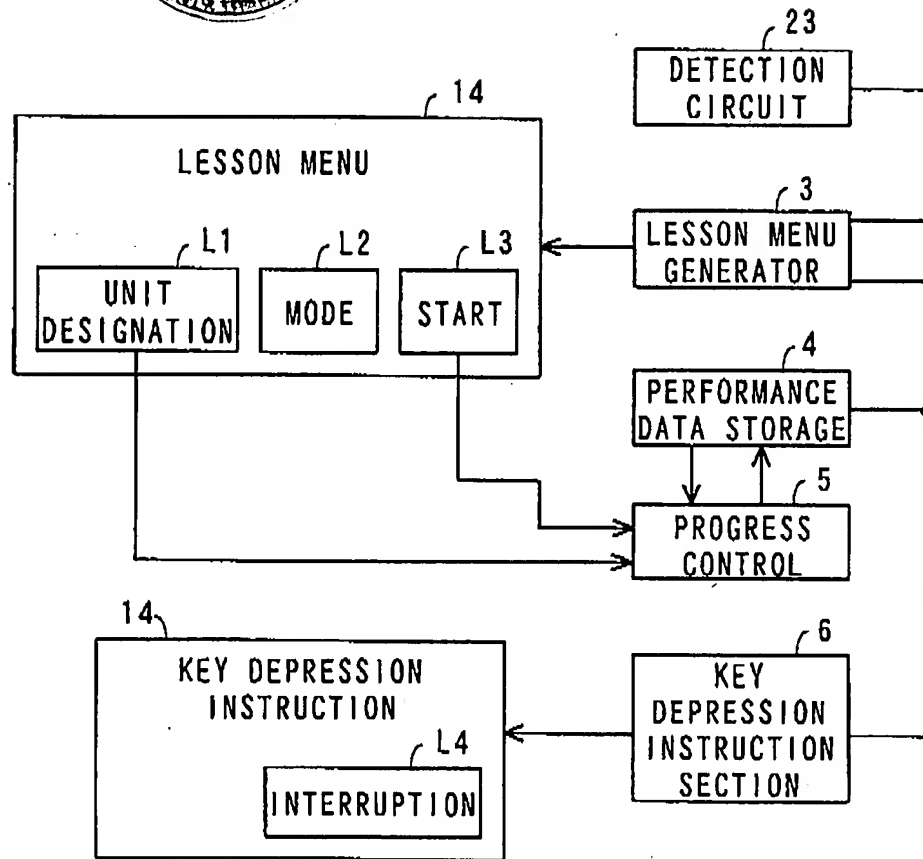
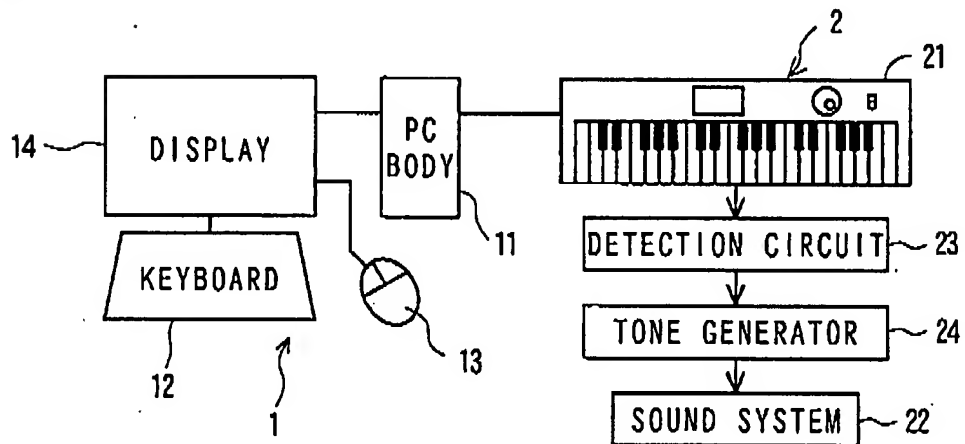


Fig. 2



F i g . 3

Diagram illustrating a musical score structure, likely a piano roll, showing five registers (R1 to R5) and three units (U1 to U3).

The registers are represented by horizontal bars with various patterns of dashes and shaded areas:

- R1: A single dash.
- R2: A single dash.
- R3: A single dash.
- R4: A single dash.
- R5: A sequence of patterns: a shaded area with 'S', a box with a dash, a dash, a dash, a shaded area with 'S', and a dash.

The units are indicated by labels U1, U2, U3, and U4, which are connected to specific registers or groups of registers by curved lines:

- U1: Connected to R5.
- U2: Connected to R3 and R4.
- U3: Connected to R5.
- U4: Connected to R1 and R2.

The piano roll below the registers shows a melody in the treble staff, starting on a middle C and moving upwards in a series of eighth and sixteenth notes. The bass staff is empty. The time signature is 4/4.

The bottom of the diagram shows a bar number sequence from 1 to 12, with a plus/minus sign and a left arrow on the left, and a right arrow on the right.

Fig. 4

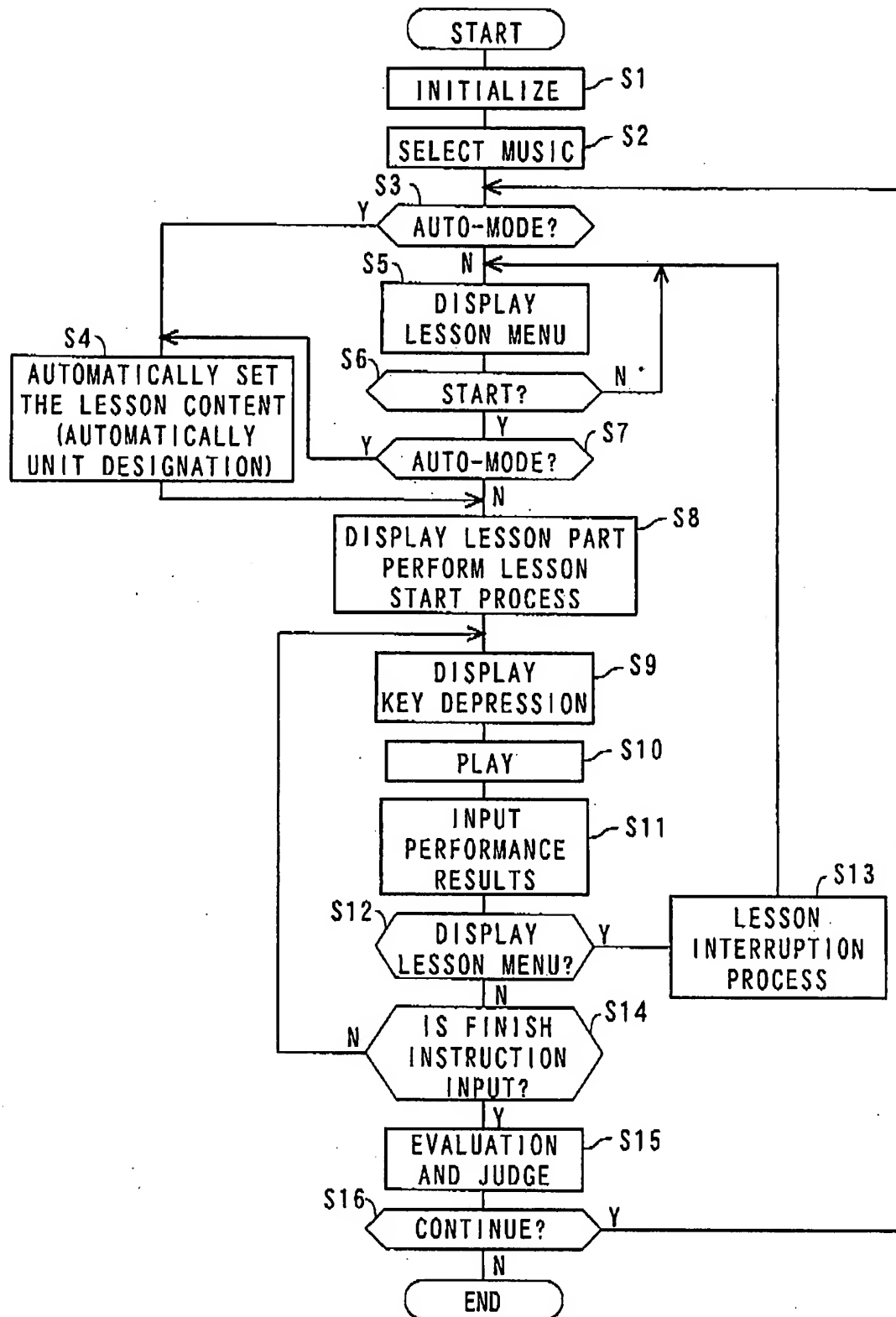
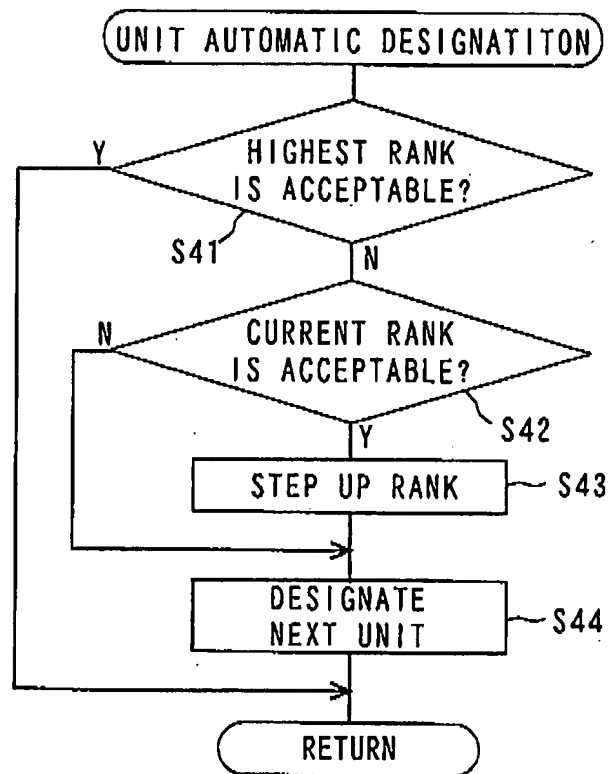
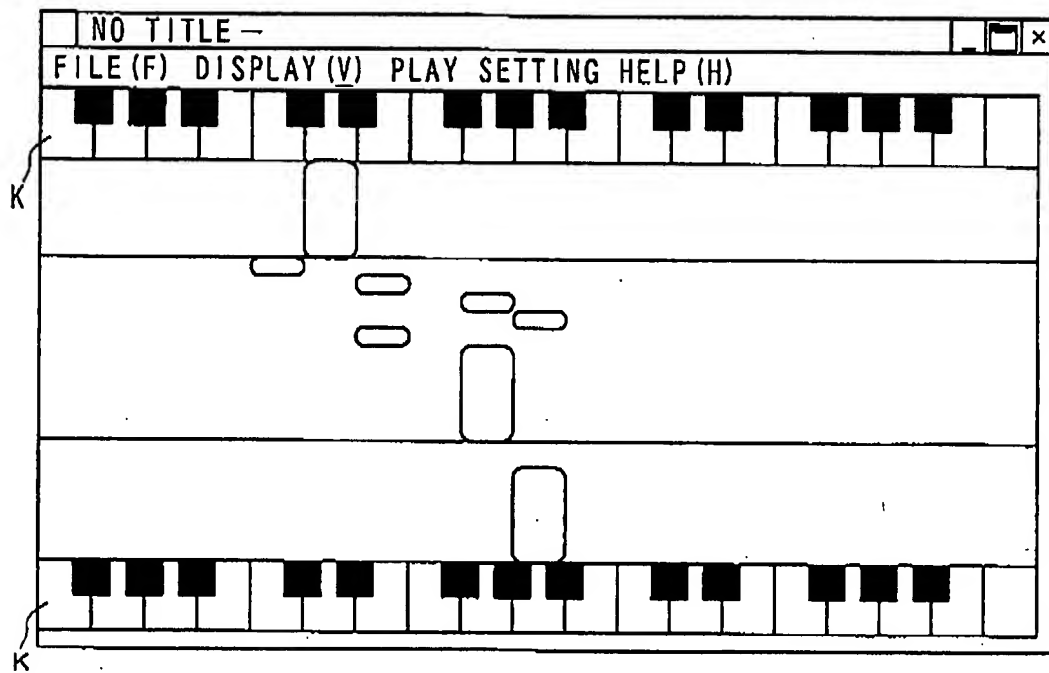




Fig. 5



**F i g . 6**



**F i g . 7**

12			-	S	-			▲
11								
10			-					
9								
8			D					
7								
6			D	-		-	-	
5								
4			G		-			
3				S				
2			G					
1								▼
BAR NUMBER			R5	R4	R3	R2	R1	+ -